

2002 Recycled Water Task Force
July 12, 2002

California Plumbing Code

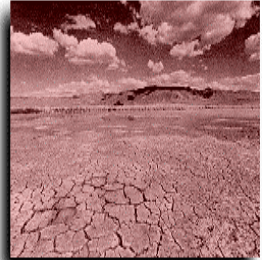
Past, Present, and Future of Dual Plumbing in California

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1991 - Critical Mass for Recycling

- There is nothing like a drought to facilitate intelligent water resource planning
- Although there were a few dual plumbed systems for toilet flushing, there was no regulatory paradigm



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Jamboree Tower in Irvine

- IRWD spent 4 years satisfying a gauntlet of city, county, and state regulators to obtain the first regulatory approvals for dual plumbing in 1991
- The first IRWD installations should have been considered a prototype because they were designed by a committee in an attempt to create a foolproof system.



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Water Use in Office Building

- IRWD found that 80% of water used in an office building is for toilet flushing, 10% for HVAC cooling tower, and 10% potable.
- Cost of dual plumbing was 9% more than conventional plumbing



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1991 - Marin County Jail

- In Marin we had a drought and building moratorium in place
- Only water available for proposed new 330-bed jail was recycled water
- County was nervous about another lawsuit from jail inmates



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Birth of AB 1698

- To facilitate dual plumbing statewide and ease concerns about lawsuits for Marin County, MMWD initiated AB 1698 with Assemblyman Bill Filante in March 1991.
- Declares that use of potable water for toilet flushing is a waste if recycled water of adequate quality is available
- Empowers public agencies to require dual plumbing in new construction

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Marin Jail Architect Refused to Design Dual Plumbing

- Citing absence of codes and standards, Marin Jail Architect, DMJM, refused to design dual plumbing system
- So MMWD hired a consulting engineer to do the job on behalf of the County
- Design followed IRWD approach at Jamboree Tower
- No problems. No lawsuits.

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California Ad Hoc Dual Plumbing Committee

- In September 1992, committee co-chaired by DWR and DHS was formed with intent to develop dual plumbing code
- Invitation from DWR to participate quoted Gov. Pete Wilson as directing state agencies to:
- "Ensure that new development make maximum use of recycled water."
- "Remove obstacles to reclamation activities."
- "Create a streamlined process for the construction and operation of both public and private reclamation facilities."

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Concerns Expressed in Ad Hoc Dual Plumbing Committee

- Plumbing and Health Officials were uncertain if reclaimed water was suitable for toilet flushing
- Concern about children playing in toilets and "catching something"
- Who would regulate dual plumbing?
- Decision was made to form subcommittee to create draft language

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Tertiary Water Suitability for Toilet Flushing

- CA tertiary water is free of virus and approved for full body contact
- Expecting this topic to come up, MMWD performed bacterial testing of potable water in "clean" toilet bowls
- No Big Surprise -- 50% of samples tested positive for Fecal Coliform bacteria

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Everything I Need to Know I Learned in Kindergarten

- Just like Mom always told you -- Don't touch that. It's yucky!
- Toilets Pollute the Recycled Water - Not Vice Versa
- Arguments to limit dual plumbing to limited occupancies are emotional and have no basis in fact.



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Signs Required in Restrooms

- Much discussion about language on signs and where to locate.
- "Caution" and "Do Not Drink" were thankfully dropped.
- Discussion about International Symbols was a real hoot.



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Dual Plumbing Is Not New

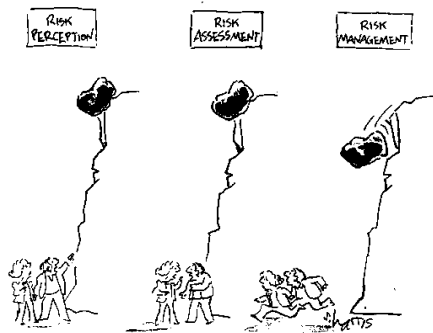
- Plumbing of pressurized non-potable piping in commercial buildings is commonplace.
- Most common are systems for chilled and heated water which typically contain poisonous chemicals.
- In 1994 UPC and UMC had no requirements for marking piping of any kind, even though the consequences of are higher.

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Fear of Cross Connections

- Almost all cross connections occur because of unmarked pipe.
- Dual plumbing for recycled water has a very comprehensive marking system over every inch of pipe.
- Since the pipe identification systems and other safeguards are superior to other plumbing, there is no justification for holding recycled water to a far more severe standard than other piping.
- Embarrassed, the 1997 UPC now requires simple labels for other piping systems.

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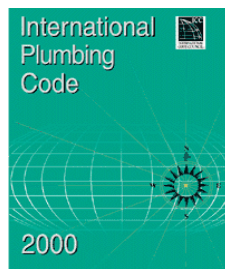
Appendix J Uniform Plumbing Code

- Over the vocal objections of the water recycling industry, Appendix J was adopted into the Uniform Plumbing Code in 1994.
- IAPMO in position to dictate code language.
- Dual plumbing code in some other states consists of simply - Mark the Pipes.
- In 2002, it was discovered that CA never adopted Appendix J into California Plumbing Code. This presents opportunity to improve the code.

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Some Codes have Simple Requirements for Recycled Water Systems

- IPC used in 25 states
- Treats recycled water like other non-potable piping systems.
- Mark the piping system & don't connect to potable.



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Uniform Plumbing Code Requirements for Non-Potable Water

- If both potable and non-potable systems exist in same building each system must be identified by labels every 20 feet.
- Each outlet for non-potable water shall be posted with wording: "CAUTION: NON-POTABLE WATER, DO NOT DRINK."
- That's it. Now lets compare the UPC requirements if the non-potable water is recycled water.

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Drawings & Design

- **For Potable & Non-Potable Systems:**
- Simple schematic of system
- Non-Potable water piping can be routed anywhere
- **For Recycled Water Systems:**
- Complete details of construction including riser diagrams, isometrics, and dimensions.
- Recycled piping can not be in same wall or ceiling cavity as potable.

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Potable, Sewage, and Recycled Water Service Lines

- **For Potable and Non-Potable Systems:**
- Potable, Non-Potable, and Sewage service lines can be installed in one common trench with no separation required.
- **For Recycled Water Systems:**
- Recycled water lines must be installed in separate trench at least 10 ft away from either potable or sewage lines.

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Pipe Identification

- **For Potable & Non-Potable Systems:**
- Labels every 20 feet
- Signs at outlets of non-potable system identifying that it is non-potable water.
- **For Recycled Water Systems:**
- Purple PVC Pipe or purple tape over metallic piping covering every inch of pipe.
- Outlets or hose bibs are not allowed.

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Purple Pipe Marking

- Example shown is at a commercial laundry in Marin
- Copper pipe wrapped with adhesive mylar tape imprinted with "Reclaimed Water - Do Not Drink"



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Signs

- **For Potable & Non-Potable Systems:**
- No signs except for outlets.
- **For Recycled Water Systems:**
- Signs in Restrooms
- Signs in Equipment Rooms
- Signs in Toilet Tanks
- Signs in Valve Access Doors
- Breakaway Valve Seals

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Locking Ball Valve

- More Purple Wrapping Tape
- Note plastic break-away seal on valve handle
- When a customer has to shut off water to fix a toilet, the water agency is supposed to come out and reseal the valve.



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Signs for Valve Access Hatches and Equipment Rooms

CAUTION
RECLAIMED WATER - DO NOT DRINK
DO NOT CONNECT TO DRINKING WATER SYSTEM
NOTICE
CONTACT BUILDING MANAGEMENT BEFORE
PERFORMING ANY WORK ON THIS WATER SYSTEM

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Inspection & Testing

- **For Potable and Non-Potable Systems:**
- **Visual inspection once during construction.**
- **Hydrostatic pressure tests for leaks**
- **For recycled water systems:**
- **Same as potable plus:**
- **Annual visual inspections forever.**
- **Even if visual inspection is OK, every 4 years the water agency is required to perform a shut-down test of both the potable and recycled systems for a minimum period of one-hour each.**

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Title 22 Amendments

- **Drafts of Title 22 Amendments in 1996 attempted to restrict the types of buildings that could be dual plumbed to office buildings only.**
- **DHS stated that the legislative intent of AB 1698 was unclear.**
- **The only prohibition in AB 1698 was mental institutions, where presumably drinking out of the toilet is not uncommon.**

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AB 1698 Tune-Up

- **In response, the WaterReuse Association sponsored legislation to make the legislative intent crystal clear to the DHS.**
- **In 1997, AB 1522 was approved with unanimous votes in all committees and in both Assembly and Senate. It specifically authorizes that dual plumbing may be required in the following structures: commercial, retail, and office buildings, theaters, auditoriums, schools, hotels, apartments, barracks, dormitories, jails, prisons, reformatories, and other structures as determined by the DHS.**

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Title 22 Adopted in 2001

- **Given the power to enable other types of structures, DHS launched new prohibitions.**
- **Prohibits “individually-owned residential units including free-standing structures, multiplexes, or condominiums.”**
- **Prohibits use in facility that “produces or processes food products or beverages.”**
- **Except that “cafeterias or snack bars in a facility whose primary function does not involve the production or processing of foods” is OK.**
- **Remember it is OK to have pressurized poisons in those areas, just not recycled water.**

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Title 17 Regulations

- **Title 17 regulations, which were adopted in 2001, introduces new obstacles to using recycled water inside buildings.**
- **Requires a backflow device be installed on fire suppression systems if recycled water is used within a building. (Examples: toilets, cooling towers, laundry, or some other industrial use.)**
- **It is not feasible to retrofit a backflow device on a fire system because the backflow device creates at least a 10 PSI pressure drop that the fire system was not designed to handle.**

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Backflow Devices on Fire System

- There is little potential for accidental cross connection between purple-wrapped copper recycled water piping and black iron fire spray piping.
- It is virtually impossible to confuse the two systems. In addition, any flow within a fire system sets off the fire alarms.
- The regulation is not a problem for new construction, only retrofits.

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Opportunity for Dual-Plumbing Retrofit of a Building Killed by Regulatory Requirement for Backflow Device on Fire Lines



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Commercial Laundry Projects in Marin Are Not Feasible Due To Regulatory Requirement to Install Backflow Devices on Firelines

- Hillside Care Center
- Pineridge Care Center
- Northgate Care Center
- Embassy Suites Hotel
- Guardian at Silveira Parkway
- Rafael Convalescent Hospital

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Examples of Dual-Plumbed Buildings in Marin

- AutoDesk Headquarters
- Software company and developers of AutoCad, 3D Studio Viz, Mechanical Desktop, and others



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Regency Plaza 1 and 2



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Shell Car Wash



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330 Bed Marin County Jail Constructed Underground



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Example of Dual-Plumbed Office Building with Food Services

- San Rafael, Marin County
- Office building with two food services: Pizza Restaurant and Mexican Restaurant
- Restrooms that serve offices and restaurants use recycled water



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Freitas Park



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Nazareth House - Landscape and Commercial Laundry



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EconoFlush Team

- Six Students from UCSB who did project on feasibility of dual-plumbing six dormitories housing 2600 students
- Estimated 20,000 gallons/day and \$23,000/ year savings



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Flushing Into the Future

- Dual Plumbing is really pretty simple. The industry paradigm to avoid cross connections is to simply mark the pipe.
- Recycled water agencies should not be forced to become "plumbing babysitters" in perpetuity to satisfy the unfounded fears of health officials.
- Regulations have been enacted with no regard to cost or reasonableness. "Nothing is impossible for the person who doesn't have to do it themselves."
- Shut-down testing presents unreasonable impact to 24/7 operations.
- New development has obligation to make the best use of limited water resources.
- Toilet flushing and other year-around uses keep the recycled water distribution from becoming stagnant in Winter.
- Ten years of experience in CA has demonstrated that there are no health problems with dual plumbed systems. It's time to take off the training wheels if we want water recycling to grow.

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